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**Chemical Reactions Practice Test**

**Test Sections**

1. Matching: Match the following vocabulary terms to their definitions.
2. Multiple choice: Choose the best answer to each multiple choice question.
3. Balancing equations: For each of the following equations, balance the equation, identify the type of reaction (S, D, SR, DR, C), and identify the reactants and products.
4. Error analysis: The student who predicted the products of the following reactions made a mistake. Identify the error in each equation, and then write the correct equation.
5. Short answer: Answer the following two questions in complete sentences.
   * #1 = law of conservation of matter
   * #2 = reaction rate

**Part 1: Fill in the Blank.**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions absorb energy and make surroundings colder, whereas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions release energy and make surroundings hotter.
2. A new substance must be produced for a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to occur.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions always consist of multiple reactants combining to form a single product.
4. Catalysts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the rate of a reaction by lowering the reaction’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ elements cannot exist in nature in the single form, and therefore are always found in pairs.
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are substances present at the beginning of a reaction, whereas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are substances formed during a chemical reaction.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ states that particles must bump into each other with a certain amount of energy in order for a reaction to occur.

**Part 2: Multiple Choice.**

1. Which of the following shows a correct way to balance the chemical equation:
   1. Fe + O2 🡪 Fe2O3
   2. 4 Fe + 3 O2 🡪 2 Fe2O3
   3. 2 Fe + 3 O2 🡪 Fe2O6
   4. 2 Fe + O2 🡪 Fe2O3
   5. More than one of the above are possible.
2. The reaction shown in problem 8 can be thought of as:
3. Decomposition
4. Synthesis
5. Combustion
6. Decomposition and combustion
7. When a molecule undergoes combustion the products are:
8. carbon dioxide and water
9. carbon dioxide and hydrogen
10. carbon dioxide and oxygen
11. carbon and hydrogen
12. carbon and oxygen
13. Which of the following is true in a balanced chemical reaction?
14. Atoms are conserved.
15. Mass is conserved.
16. A and B are both correct.
17. Which statement explains the law of conservation of matter?
18. In a chemical reaction, matter can only be destroyed
19. Matter can neither be created nor destroyed in a chemical reaction
20. In a chemical reaction, matter can only be created
21. Matter can be created or destroyed in a chemical reaction
22. The substances to the left of the arrow in a chemical reaction are called
23. Products
24. Subscripts
25. Coefficients
26. Reactants
27. What type of reaction releases energy in the form of heat?
28. Geothermic
29. Endothermic
30. Subthermic
31. Exothermic

**Part 3: Identifying and Balancing Chemical Equations.**

For each of the following equations, balance the equation, identify the type of reaction (S, D, SR, DR, C), and identify the reactants and products.

1. \_\_\_\_\_\_\_H2 + \_\_\_\_\_\_\_P 🡪 \_\_\_\_\_\_\_PH3

|  |  |
| --- | --- |
| H:  P: | H:  P: |

|  |  |  |
| --- | --- | --- |
| Type of Reaction | Reactants | Products |
|  |  |  |

1. \_\_\_\_\_\_\_Ti2O3 + \_\_\_\_\_\_\_C 🡪 \_\_\_\_\_\_\_Ti + \_\_\_\_\_\_\_CO2

|  |  |
| --- | --- |
| Ti:  O:  C: | Ti:  O:  C: |

|  |  |  |
| --- | --- | --- |
| Type of Reaction | Reactants | Products |
|  |  |  |

1. \_\_\_\_\_\_\_Na2SO4 + \_\_\_\_\_\_\_CaCl2 🡪 \_\_\_\_\_\_\_CaSO4 + \_\_\_\_\_\_\_NaCl

|  |  |
| --- | --- |
| Na:  SO4:  Ca:  Cl: | Na:  SO4:  Ca:  Cl: |

|  |  |  |
| --- | --- | --- |
| Type of Reaction | Reactants | Products |
|  |  |  |

1. \_\_\_\_\_\_\_ReF5 + \_\_\_\_\_\_\_HCl 🡪 \_\_\_\_\_\_\_Re2Cl10 + \_\_\_\_\_\_\_HF

|  |  |
| --- | --- |
| Re:  F:  H:  Cl: | Re:  F:  H:  Cl: |

|  |  |  |
| --- | --- | --- |
| Type of Reaction | Reactants | Products |
|  |  |  |

**Part 4: Error Analysis.**

The student who predicted the products of the following reactions made a mistake. Identify the error in each equation, and then write the correct equation.

| **Chemical Equation** | **Error** | **Correct Equation** |
| --- | --- | --- |
| 1. KCl 🡪 K + Cl |  |  |
| 1. MgBr2 🡪 Mg + Br |  |  |
| 1. Ca + N2 🡪 CaN2 |  |  |
| 1. Ga + F2 🡪 GaF2 |  |  |
| 1. Al2O3 🡪 Al2 + O3 |  |  |

**Part 5: Short Answer.**

Answer the following questions in complete sentences.

1. Name the five factors that increase the rate of a reaction. Then, explain why increasing the concentration of reactants increases the rate of a reaction. Frame your answer in terms of collision theory.

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1. According the law of conservation of matter, you might have a carbon atom in you that came from a dinosaur. How is this possible?

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